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Waste and Waste Management

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Table of Contents:

Abstract:

Discard studies have demonstrated that waste is more than just a symptom of an all-too-human demand for meaning, or a merely technical problem for the likes of sanitary engineers and public health officials. The afterlife of waste materials and processes of waste management reveal the centrality of transient and discarded things for questions of materiality and ontology, marginal and polluting labor and environmental justice movements, as well as critiques of the exploitation and deferred promises of modernity and imperial formations. There is yet more waste will tell us, especially as more ethnographically multi-species studies begin to document the many ways that our wastes are not only our problem, but become entangled with the lives of nonhumans and the future of the Anthropocene.

Introduction: the Productive Afterlife of Waste

For many anthropologists and other social scientists waste is a mirror of humanity, a means or intermediary by which to reflect upon ourselves (Knechtel 2007: 9). This is the legacy of Mary Douglas' (1966) influential definition of "dirt" as that which challenges and reaffirms a given cultural system. According to this structural-symbolic account, along with complementary analyses by Leach (1964) and Dumont (1980), the reason that an inedible animal, a dirty word, untouchable Dalits and rejected rubbish are categorized as objectionable and disposable in the first place is that they each stand in for a basic cognitive, existential and/or linguistic dilemma—a need for meaningful order in a world without it. These ideas remain fundamental for approaches to waste in the human sciences (Moser 2002; Scanlan 2005; Boscagli 2014). But a growing set of approaches and perspectives, often grouped under the name "discard studies" have begun to occupy the gaps left behind by the structural-symbolic approach. Despite many differences, these scholars tend to focus on the productive afterlife of waste—its impact on and significance for humans and nonhumans. More than a symptom of culture, waste is a material that has effects in the world, including local and global political disputes, liberal and illiberal forms of governance, competing assessments of economic and moral value, as well as concerns about environmental pollution and crisis. This essay provides an overview of these recent and emerging discussions in anthropology and beyond.

Cleaning and wasting are quite familiar to us, and once discarded their products have to be dealt with somehow, or managed. Yet in many ways research on what becomes of all that we discard has only just begun. Until relatively recently, anthropologists have had little to say about waste management. Arguably this tendency reflects a preference for "social" ideas over "individual" techniques that goes back to formative epistemological distinctions between science and technology, as well as religion and magic (Ingold 2000: 317). But the techniques of waste management are worth appreciating in their own right. If classificatory rules mediate how waste is managed, then the reverse is also true—waste management is more than a byproduct of a distinctly human demand for order, but a process actively involved in reshaping our ideals and imaginations in turn. Today, adequate waste services are considered vital to the governance of cities, industries and refugee camps: a basic human right, an economic opportunity and an ecological imperative.

For ethnographers of waste and waste management, it is not enough to wonder why certain things or people are categorized as polluting and disposable, therefore. In addition they ask: a) what specific capacities and affordances characterize waste materialities, their management and

meaning; b) who manages wastes and what do they become together in specific entanglements of labor, power, and possibility; and c) how do specific wastes circulate, from whom to whom, and with what significance for specific waste regimes as well as more general global and planetary processes? I consider each of these dimensions of contemporary discard studies in turn, pointing to some of limits and possible future directions for research.

The idea of waste management can also be problematic if it suggests human mastery over and control of the physical world. Indeed, the very existence of unusable, unassimilable waste could be seen as proof, pungent and polluting, of our own limitations (Allen 2007: 204). I conclude this essay with a call for renewed attention to the active role of non-human beings and processes in waste management, against the tendency to imagine waste relations exclusively in terms of privileged human violation of or instrumental plan for a passive nature. If infrastructure draws our attention to taken for granted dimensions of social life (Larkin 2013), our everyday dependence upon materials, devices and labor, then waste infrastructure can help us to realize our dependence upon non-human life forms and forces with which we share our bodies, environments and, ultimately, our planet.

Streams: Waste Materialities and their Management

Disposal raises normative questions about how one ought to rid oneself of things, including what should be discarded when, and where it ought to go. In this sense, making waste is part of what makes us the ethical selves we want to become (Hawkins 2006). Disposal may be done pass on still useful objects to other people, as with the informal transactions of charities, junk yards or garage, car boot and yard sales (Gregson et al. 2007). It may also occur in less permanent ways, as when things are put away temporarily with the possibility of future reclamation or discard (Thompson 1979; Hetherington 2004). Like commodity fetishism, furthermore, the disposal of things can distort perceptions of reality, making the routine appearance and disappearance of things seem phantasmagoric (Kennedy 2007). Taken collectively, wanton disposal can be used to call into question the “invidious distinction” between classes (Veblen 1899), an abusive relationship between society and nature (Lynch 1990; Foster 2002), and the obsolescence built into the designs and desires of consumer capitalism (Packard 1960).

But beginning with acts of disposal can establish a false equivalence between the kinds of things disposed of. There is not one kind of discard: nothing is waste in general but only in particular. People may not want food scraps or toxic sludge in their homes, but there is a great deal more to be said about what actual qualities and virtual possibilities distinguish these “out

of place" substances: about how they might be or ought to be handled, and about where and to whom they might yet belong. This brings us from individual acts of disposal to the collective management of wastes. The idea of different waste streams comes from sanitary engineering and offers a helpful starting point. Rather than displaced waste in general, one can imagine flows of different materials, with distinct properties and headed for different destinations.

Take the familiar practice of disposing of hair, nails and excreta. Precisely because of their lingering association with the person who released them, they can generate moral dilemmas concerning the regimentation and revaluation of bodily traces, including their use in sorcery (Frazer 1980; Gell 1998) or forensics (Reno 2012). The products of human and non-human digestion can just as easily be regarded as an example of creative potentiality, whether raw material for ritual acts (Bourke 1891), a practical resource (Guillet 1983), or as representative of the cosmos itself (Walens 1981).

Disposed of in sufficient quantities biological effluent can also spread pestilence and miasmatic stenches (Barnes 2006). A Eurocentric historiography of modern technological and medical innovations belies the uneven development of waste service provision, as a result of which marginalized subjects may be held accountable for their disproportionate exposure to disease (Briggs and Briggs 2006), thereby obfuscating the right to effective wastewater treatment (Zimmer et al. 2014). Even where disposal systems are put in place, however, people continue to subsist in their margins, both challenging and sustaining the system at the same time. Parisian sewermen (Reid 1991) and London toshers (Pike 2004) can turn collectively managed sewage into a source of material enrichment, whereas Aghori Hindu ascetics consume corpses and excrement to attain divine transcendence (Parry 1982). Productive tensions arise, not only concerning whether bodily waste is more moral/material pollutant or spiritual/practical resource, but to what extent it is to be managed by the state, self-discipline, or some combination of both (Laporte 2002). The spread of sewerage can radically transform relations between waste producers, workers, and products. Where excretion becomes associated with water infrastructure and metabolic visions of the modern city (Gandy 2004), public latrines transform into private bathrooms and negotiations with "night soil" workers are transferred to bureaucrats, politicians and plumbers (Van der Geest 2002a). Scientific models of polluting wastewater, which mandate careful regulation, may rest uneasily with alternative perceptions of landscapes, furthermore, as with the tensions between (post)colonial, industrial and Hindu assessments of the sacred Ganges (Alley 2002).

Household rubbish or Municipal Solid Waste (MSW) is an outcome of parallel transformations in urban infrastructure (a management of solids

rather than liquids). MSW—the mass waste of populations—is what most people mean when they refer to garbage, trash, or discard. This is the image of waste that comes most readily to mind when policy reforms or environmental risks are publicly debated and discussed: waste enclosed in black bags or left in the open as litter. As such, MSW infrastructure can further shape personal identity and social judgment. Japanese citizens may proudly display their recyclables for neighbors to admire (Hawkins 2006: 107-110), while Cypriots and Chinese migrants are both judged as culturally repugnant for littering public space with what should have been left for waste workers to collect (Argyrou 1997; Dürr 2010).

But using MSW as a synecdoche for all waste would be a mistake. For one thing, the amount of MSW in any society is typically dwarfed by the wastes of commercial enterprise. Consider the category of "food waste," which calls to mind consumer and retailer misuse of edible goods. While important, it is dwarfed by the many expenditures and losses of agricultural production, which never make it to the marketplace yet still must be dealt with (Krzywoszynska 2012).

Industrial wastes exist in such quantity and variety that they inspire entirely new products in capitalist industry. At different times petroleum spirit, coal-tar and glycerin were all externalities of production that gradually became revalued as essential products (O'Brien 2007). But far more waste is disposed of than reused. Industrial wastes thus pose a far greater risk to environmental and human health and safety, leading to worldwide debates surrounding pollution from resource extraction and commodity manufacture (Kirsch 2014; Little 2014). These harmful materials are commonly known as "toxic" or "hazardous" waste streams, owing their categorical separation from MSW to a further division of waste labor. Toxic wastes are, by definition, more dangerous as a result of their distinct physical properties and ideal methods of treatment. The category of toxic waste is also productive of new economic arrangements and international policies. Industries and states regard toxic waste as the most economically attractive waste to ship abroad to places with reduced regulatory restrictions, as is the case with the growing, global stream of Waste Electrical and Electronic Equipment (WEEE or E-Waste) and the controversial ship-breaking industry, both of which involve objects that are profitable to reuse and recycle and highly toxic to strip and dispose of (Gabrys 2011; Gregson and Crang 2010; Crang et al. 2012).

Other industrial waste streams can be singled out as uniquely destructive in ways that challenge the causal simplicity of the waste stream metaphor and, more broadly, the metaphor of managerial control. The degradation of plastics, for instance, releases chemical plasticizers, the flow of which through living bodies and environments can be difficult to trace and may entail severe health risks (Strong and Garruto 1991; Duffield et al. 1994;

Liboiron 2013b). Similarly, nuclear wastes require additional technological and regulatory innovations to contain their singular capacity for contamination and accumulation (Garcier 2012). Radioactive by-products make clear the familiar temporality of less troubling forms of waste and the manageable and imaginable time-scales of their breakdown. The contamination of nuclear wastes exceeds human lifespans, involving a planetary "deep time" beyond familiar temporal horizons (Ialenti 2014). Though much the same could be said of the average MSW landfill, which can release methane with twenty-five times the greenhouse potential of carbon dioxide through the decay of ordinary biodegradable trash. In this way, a casually discarded banana peel or the belch of an ordinary dairy cow both contribute to the planet's transition to a new geological epoch, also known as the Anthropocene (Ogden et al. 2013).

Waste streams needn't be environmentally toxic to generate moral concerns and controversial property relations. Similarly challenging are abundant biomedical wastes (Parry and Gere 2006: 140). When it comes to Assisted Reproductive Technologies, the possibility of embryos or umbilical cords becoming waste may be foreclosed altogether, even as forms of disposal are increasingly central to biomedical practice (Thompson 2007: 264; Santoro 2009). So too with medical charities which seek to reuse the many usable items that hospitals and clinics discard in order to protect patient health and avoid legal liability. To the extent that aid workers revalue medical discards as a form of humanitarian care or Christian blessing for recipients abroad, they may strongly resist the notion that they are helping to dispose of something worthless (Halvorson 2012).

An analysis of different waste streams reveals distinct material capacities, which shape the ways that these by-products can be managed and the uses to which they are put. This flow of various waste streams depends on the mediation of waste management infrastructure and the broader socio-material relations of which they are a part.

Waste and Becoming

Waste streams tend to change or deteriorate over time, if for no other reason than they are no longer actively maintained. As Tim Ingold writes, "[l]eft to themselves … materials can run amok. Pots are smashed, bodies disintegrate. It takes effort and vigilance to keep things intact, whether they be pots or people. The same is true of the gardener, who likewise has to struggle to prevent the garden from turning into a jungle" (2010: 9; cf. Deacon 2012: 207). The deformation of waste, could be seen as the inevitable counterpart to creating and maintaining form (Lynch 1990; Hawkins and Muecke 2002; Bauman 2004; Viney 2014).

As they circulate and deform, wastes mix with people and places, with

which they mutually transform, or become together. As with exchange practices, acts of rejection, remaking and reuse change people and their relations with each other as much as they do the objects themselves.

Pollution and Human Waste

When waste management infrastructure is lacking, people and waste may mix in ways that threaten the humanity and dignity of the former. In refugee camps, for example, inhabitants are kept in a state of suspension between political regimes in order to receive humanitarian aid and protection from conflict—they thus represent political dirt, in Douglas' sense (Malkki 1995)—and though camps are typically planned by the UNHCR in order to promote hygiene and health above all (Herz 2008), in practice inadequate waste removal can expose inhabitants to illness and disease (Habib et al. 2006). A marginalized or exceptional social and political status is not only metaphorically waste like, therefore, but can increase exposure to other peoples actual wastes and the risks thereof.

If infrastructures can be defined as "matter that enable the movement of other matter" (Larkin 2013: 329), then waste management infrastructure is arguably unique in that the material circulated is secondary, the byproduct of the subtraction of unwanted matter from particular settings (Osborne 1996; Joyce 2003). The role that waste management infrastructure plays is typically absential: waste management makes things disappear by moving them elsewhere and, like most infrastructures of liberal governance, waste management is considered most successful to the extent that its workings and flows remain invisible. Waste management infrastructure is thus bio-political, in the sense that it involves care for the vitality, the life and well-being, of populations (Foucault 2008; Alexander and Reno 2014).

For waste to end up somewhere else, regardless of what is done with it, requires labor. More humble acts of waste management occur outside the aegis of any municipality, corporation or state. Varieties of cleanliness, of lived-in places, social spaces and bodies, has become normalized and requires constant effort to maintain (Elias 1969; Hoy 1995; Shove 2004). On the one hand, there are care-givers and domestic workers, paid and unpaid, who routinely expose themselves to forms of pollution in order that they might keep others clean. Separate but related literatures explore the politics of household work (Constable 1997; Strasser 2000; Anderson 2000; Hondagneu-Sotelo 2001) and professional care-giving (Jervis 2001; Van der Geest 2002b; Twigg et al. 2011), as typically performed by female and migrant labor. The provision of workers to clean places, spaces and bodies, often for low pay or none at all, is made possible by and reinforces divisions of gender and class, even as it provides women with opportunities to resist the indignities of filthy, denigrated labor (Barbosa 2007; Brody 2007).

Outside domestic domains, waste picking and informal recycling also tend to be gendered and infantilized (Norris 2010; Fredericks 2012). On the one hand it is not surprising that people with lower status should engage in lower status and polluting work. On the other hand, like domestic or household labor, waste work could also be seen as a logical extension of social reproduction and affective labor, that is, as part of caring for others.

If successfully managed and removed from inhabited areas, waste must go somewhere and be dealt with by someone. The most common way of dealing with waste is to dump it, whether in bodies of water, in streets and alleys, in geological depressions, or on open land. Dumping can be understood as a logical counterpart to the basic rejection of things, the removal of what is unwanted. Dumping waste suggests that getting rid of it is the primary goal, irrespective of what comes of the waste when it is removed it must move on. Here waste is also managed as if its only potential was as an impediment or threat to specific forms of life. Consequently, its absence makes those forms of life possible. As something "dumped" the only social afterlife waste may arise through processes of mitigation and reparation, for example, as a problem for communities in proximity to the dumping site (Reno 2011a; Dahlberg 2012; Little 2014).

When exposure to waste becomes part of a professional vocation, rather than something done in private (see Dumont 1980: 93) or which arises due to inauspicious proximity to a waste site, it can also raise the possibility of stigma. This is most obvious in the case of the enduring association between dirty and polluting trades and dalits of the Hindu caste system (Jayaraman 2008; Gill 2012), though it is common for marginalized social groups to end up doing dirty work (Zimring 2005; Furniss 2010). As is the case with people of marked ethno-racial identity in North America (Bullard 2008), moreover, to the extent that Indian caste is associated with poverty, a person does not have to work directly with waste to be disproportionately exposed to waste sites, since they are more likely to live in rural areas where land is cheaper and political resistance is less effective (Srinivasamoha 2013). The important point is that work with waste is not merely an outcome of one's place in a pre-determined social hierarchy, but is actively reinforced in practice by becoming with waste in different ways. Douglas (1966), in line with Dumont's (1980) analysis of the Hindu caste system, distinguished between stratification on the basis of categorical purity/impurity from that based on the accrual of wealth, but as Barbosa (2007) shows in the case of Brazilian domestic workers, the two can also be compatible.

Creativity and Possibility

When people and places become associated with waste, they may be seen as waste themselves, that is, as disposable and abject subjects without

potential (Bauman 2004). But exposure to waste can also provide opportunities for the recovery of wealth from what otherwise would be disposed of.

At all stages of the dumping process—during cleaning, collection, sorting, and disposal, wastes can be recovered, remade and given life as part of a new creative process. This too poses risks. Regardless of the waste stream involved, an open-ended transformation is made possible through the productive combination of human creativity, the material vitality of wastes themselves, and the physical surroundings where they come to rest (Bennett 2010). The transformation of waste may be a source of contamination, literal as well as metaphorical; it might possess traces of its former bearer, whose identity could be stolen or privacy violated; it may also have indeterminate value, either as an actual object or as part of its underlying material substance.

The most common form of reuse throughout the world is the informal recycling that occurs as part of informal economies in and around urban settings and their dumps (Medina 2007). In the privileged corners of the Global North, exotic images of poor children scavenging on dumps have become a popular object of cosmopolitan consumption and moral concern. On the one hand, this denies the informal recycling that occurs among economically and politically marginal figures in wealthier societies. Children picking through dumps in Kenya or Brazil are more likely to be depicted in global media than the informal waste recycling of homeless Californian drug addicts (Bourgois and Schonberg 2009), middle class landfill workers in Michigan (Reno 2009), or dumpster-diving anarchists collectives in global cities the world over (Giles 2014). Even in poorer parts of the world, informal waste pickers are not merely unfortunate victims of exploitation, anymore than are domestic workers (Brody, 2007; Aguiar and Ryan 2009). It is not the perceived indignities and abjection of mixing with waste that concerns many of them, but their access to good waste loads as well as periodic price fluctuations in the global recycling market (Sicular 1992; Tranberg 2000; Mitchell 2008, 2009; Alexander and Reno 2012).

In places with entrenched or emerging waste management infrastructures, alternative modes of valuation may come between different kinds and classes of waste workers also, some of whom wish to reclaim waste for profit while others may be compensated for dumping it (Millar 2008; Reno 2009; Lane 2011). Different forms of waste labor are no more identical than are alternative waste streams. A unionized “san man” in New York City is different from a child searching for scrap to sell in Buenos Aires or a Zabbaleen garbage collector in Cairo. At the same time, they all must attend to the particular qualities of transient matter, to processes of deformation. Waste labor is as much corporeal as it is representational, it involves an appreciation for the capacities of things to become and not only

to contaminate (Norris 2012; Zhang 2014b). Moreover, the labor of waste management is often dangerous, threatening workers with illness and injury as well as their social identities (Nagle 2013). This is especially so where potentially toxic waste streams are dumped in contexts with insufficient state regulation and/or enforcement (Burrell 2012; Crang et al. 2012). Yet the implementation of reforms, ostensibly for environmental protection and worker safety, can also threaten the livelihood of waste pickers (Hill 2001; Millar 2012).

Overall, there is less ethnographic research on different technologies of disposal, incineration, recycling and landfill, then there is on informal waste recyclers. This will likely need to change as informal recycling cooperatives are dispossessed through the further privatization and bureaucratization of waste management. Future ethnographers will need to attend to the practical, economic and bureaucratic dimensions of new regimes of waste management, while simultaneously identifying those alternative waste practices and skills that are being displaced and those that continue to subsist on the margins.

What work has been done on waste treatment technologies demonstrates that many of the same problems which beset common dumps and their pickers still linger on in the most regulated and mechanized waste sites. Incinerators may be protested and resisted as a source of pollution (Clark 2007; Alexander and Reno 2014; Zhang 2014a), despite their long favored status among sanitary waste engineers as an efficient way of eliminating waste while recovering heat and power. “Sanitary” or “modern” landfills attract similar opposition, also because of what they release into the atmosphere, but are troubled by the additional concern that they might leak into surrounding environments and bodies (Falasca-Zamponi 2010; Reno 2011a). Unlike common dumps, however, these landfills are more carefully designed to cordon off waste from both society and nature, maintaining their contents in a state of suspended animation. This makes it possible for landfills to one day be recovered as an invented commons, a source of new land upon which to build or reclaim for other purposes (Horne and Nagle 2011). However, this model of burial and reclamation may come at the cost of reusing worthwhile items from the rubbish. When waste management becomes heavily dependent on landfill, as has occurred in countries like the United States, the result is a dump regime (Johansson et al. 2012), where waste is neither commodified nor repurposed. Instead, it is reduced to a sacrifice of air space, a material that limits the amount of refuse which can be taken in, reshaping the labor of employees and the profit schemes of owners in turn (Bélanger 2007; Reno 2009).

Dump regimes diminish opportunities for cultivating “arts of transience” (Hawkins 2006: 129) by which people creatively reuse materials and remake their own lives and relationships. The result is a significant loss

of both material and human potential.

Scales: Human and Non-Human Geographies of Waste

Waste is not only something out of place, but is inseparable from the production of spatial relationships at a variety of scales. Waste flows and politics connect people across great distances, and become entangled with planetary, nonhuman processes.

Opponents of waste sites are sometimes characterized as NIMBYs (Not in my backyard), as if to provincialize their interests. In order to challenge an understanding of waste politics that would be limited to "end of pipe" concerns, Zsuzsa Gille (2007) uses the concept of a "waste regime," which describes unifies representations, practices and politics of waste within a single analytical category. Central to Gille's analysis of waste management transitions from socialist to post-socialist Hungary is the way in which waste is dominantly understood and dealt with in a given place and time. According to Gille, any prevailing waste regime will have blind spots, because of its narrow focus on some materials rather than others (on recoverable metals rather than toxic chemicals, for example). As a consequence, materials have a tendency to "bite back" against the dominant trends in waste management, exposing their limitations.

The management tendencies of waste regimes reverberate across multiple scales. The politicization of local waste sites—such as the Love Canal disaster—can result in changes to entire waste regimes (Pellow 2002; Rootes 2009). One can identify a contemporary shift in waste regimes throughout much of the world, as political reforms at national, regional and local levels have led to the innovation of new management techniques based on the representation of waste as a resource. In various ways, these initiatives challenge the notion that abundant waste is inevitable, that humankind is wasteful by necessity rather than design (Liboiron 2013a).

New and emerging technologies are being promoted as regulatory regimes seek to compensate for the loss of landfill space, to satisfy public demands for more recycling, and to avoid the production of greenhouse gases. Efforts to reuse waste before landfill, or mine it afterward (Johannsson 2012), are limited to the extent that waste is seen as something merely polluting. Leading alternatives to landfill or incineration include thermal waste treatments, like gasification and pyrolysis, and those involving organic decomposition, like in-vessel composting, anaerobic digestion (Reno 2011b), or more domestic "eco-enzyme" devices (Zhang 2014b). The recovery of energy or fertilizer from waste treatments such as these does not eliminate the threat of pollution and public resistance, however, and may even incentive the production and importation of waste (Reno 2011c; Alexander and Reno 2014).

A more familiar recent policy initiative is the "consumption work" of recycling (Wheeler and Glucksmann 2014), which places more of a burden on households to sort wastes for reuse. Recently, food waste reforms have begun to target improper consumption (Alexander et al. 2013; Evans 2014), even as the food industry profits from its profligate waste (Giles 2014). While economic incentives and moral shaming campaigns focus on consumer and retail practices, the possibility of compelling manufacturers to produce less waste is foreclosed. Recycling initiatives can also distort the social relationships involved in disposal if they appear to relate consumers directly to "Nature." While recycling may be imagined as an act of environmental virtue, it becomes entangled in a growing form of global trade, frequently relying upon toxic and low paid labor in the Global South (Alexander and Reno 2012).

With the demand for improvements in waste regulation and infrastructure in wealthier countries, the cost of domestic disposal makes transnational waste shipment more attractive. At the same time, environmental justice activists and NGOs have gone global, calling attention to waste sites where infrastructure is inadequate or missing altogether (Pellow 2007). It was as a result of international activism that the shipment of toxic waste from rich to poor nations was eventually prohibited by international regulations, especially the Basel Convention of 1992/1996. And yet, new wastes (such as WEEE) and new economic arrangements continue to muddy the regulatory distinction of toxic waste from recoverable resource (Clapp 2001; Lepawsky and MacNabb 2010). The post-Basel waste regime has further blind spots, moreover. Waste trading from Global North to South is monitored and politicized by numerous NGOs and media organizations, while generally unregulated and ignored North-North and South-South trades grow in size and importance (O'Neill 2000; Lepawsky 2014).

Not only waste, but also waste regimes have been exported and experimented with abroad, through colonial and imperial formations that implicate subjects at the "core" and "periphery" equally. British colonial officials experimented with the recovery of biogas from biological waste decomposition in India prior its introduction in the UK. In general, "civilizing" colonial subjects meant disciplining their wastes and waste practices as objects of scientific knowledge and political control (Anderson 2006). The purported "universality" of Euro-American sanitation has been challenged in contexts where the costs of modernity are borne even as its promises are endlessly deferred (Chakrabarty 1992). This deferral can itself amount to a strategy of abandonment, constitutive of imperial formations that leave uneven traces in the form of ruins and ruination (Stoler 2013). Accra, Ghana can be characterized both as a dumping ground for the WEEE of the Global North (Burrell 2012), as well as a city with a growing and poorly managed

domestic waste burden of its own (Baabereyir et al. 2012). If communities are routinely exposed to sites where pollution has been left behind and landscapes ruined, moreover, they may struggle to represent their environmental suffering, or come to expect it as an ordinary part of the landscape (Masco 2006; Auyero and Sistun 2007, 2008). Informal waste practices proliferate in poorer waste regimes, potentially frustrating the ambitions of international lenders and local elites aiming for waste reform (Chakrabarty 1992; Furniss 2010; Fredericks 2012).

The distinction between "local" and "global" sources of waste can disguise the common structural and political-economic origins of both, associated with the spread of capitalism and its crises, a growing divide between the world's rich and poor, as well as political conflict and ethnonational divisions. These serve to increase the number of people who are "redundant" because they are unemployed, disabled, racially marked or threatening to security state apparatuses (Bauman 2004). These structural tendencies conspire to dehumanize people all over the world, as if they were human waste (Yates 2011). Their disproportionate exposure to waste sites and streams is constituted by and constitutive of these wider structural processes, but it also provides opportunities for creative acts of resistance (Faulk 2012; Liboiron 2012).

Waste can also circulate and "bite back" as a result of non-human flows and divides. This is most obvious in the case of climate change, to which waste sites are a leading contributor. But in some way industrial emissions are a familiar concern for many waste regimes, carbon dioxide has merely become a new and planetary miasma, part of the existing regulation of the air (Corbin 1986). More challenging is the Pacific Garbage Patch, a region of the Northern Pacific Gyre which has attracted both floating plastic debris and global concern and fascination. A relatively recent discovery, oceanic patches have grown for decades, mixing with marine environments and forces, without any human beings deciding they were "out of place" or governments intervening to regulate or mitigate their impact. But even when it ends up on beaches (and can therefore be more directly assessed and addressed), people debate what scales to concern themselves with: whether this plastic waste should be quickly cleaned up as a nuisance, or be carefully documented as evidence of a more-than-human, global environmental crisis (De Wolff 2013). The hidden and unmanaged circulation of plastic in ocean currents challenges the assumption that all waste finds its place as a result of human design.

Conclusion: ~~Our~~ Waste

The pollution of the world by human waste has become a basic anthropocentric conceit, a belief that we are set apart because of the

uniquely contaminating impact of what we leave behind (Lynch 1990: 43). The idea of the Anthropocene usefully draws our attention to broader planetary forces in which industrial activities are enmeshed. In this sense, waste is not only a mirror of humanity, but actively partakes in climate change, geological formations and oceanic gyres. At the same time, care should be taken lest an appreciation for human impact become conflated with an anthropocentric belief in the power and reach of human managerial control. Waste, in all its variety and complexity, should serve as a reminder that we can never fully grasp the planetary processes to which we contribute, nor assume that they are easily managed.

By reducing waste to an all-too-human byproduct in need of rational management, we foreclose from consideration how waste may exist for non-human beings, how it is not merely something that happens to them.

At one scale, even our most intimate waste is not ours alone. Traditional germ theories of sickness and health are based on distinctions between pure and impure, inside and outside, as if our collective species and our individual bodies were self-contained (Tomes 1999). But these boundaries—upon which are based hygienic and sanitary practice—are unstable and, with renewed biomedical appreciation for the material powers of waste, are becoming even more so. The "hygiene hypothesis" proposes a link between too much cleanliness, a "civilized" rejection of dirt, and the proliferation of ailments and allergies of the respiratory and gastrointestinal systems (Gwee 2005; Koloski et al. 2008). According to this theory, health is made possible precisely through microbial invasion and the resulting ecological balance within our bodies. It is based on this idea, of a body necessarily invaded by helpful microbes, that there has been a resurgence of interest in fecal transplants (Wolf-Meyer 2014). Here, feces that carries the microbial remnants of a healthy gut's ecology becomes an instrument of health management, rather than a problem for waste disposal, a resource rather than filth.

Beyond the micro-ecologies of guts, there are further entanglements that derive from the wastes humans release into their environments. Urban settings and waste sites teem with creatures that subsist on our wastes, from pigeons, to pigs, rats, mice, dogs and cockroaches (Nagy and Johnson 2013; Reno 2014). But this is a widespread phenomenon. Reid and Ellis (1995) demonstrate that Turkana pastoralists unintentionally reproduce rare tree species in the vicinity of the corrals where they pen their animals. It is precisely the defecation of livestock that serves to ecologically "recruit" vulnerable tree species, which would otherwise struggle to survive in the arid landscape. Sillar (2000) argues that the production of every artifact is embedded in interdependent relationships both with other social and technical practices as well as wider environmental relationships, using Andean dung utilization as an example. Waste is always relational, and not

only because someone elected to dispose of it. It is also embedded in further relations with life forms and forms of life implicated in its vital materiality (Gregson and Crang 2010).

At the same time, the designs, devices and laboring bodies that manage wastes are of grave importance to the future of this planet. For this reason, the engineering techniques of waste management are now and have always been as much moral and political as they are mechanical and mathematical. Moreover, as emerging DIY and scholarly-activist collaborations demonstrate, there are other ways in which anthropologists and other scholars might productively engage with vital matters of human living, which otherwise become the exclusive domain of sanitary engineers, urban planners and environmental policymakers (Liboiron 2012; The Grassroots Mapping Forum 2014; Hird et al. 2014).

The future of discard studies needs to engage with waste management more closely, to compare technical innovations in production, consumption and disposal, to identify opportunities and injustices. At the same time, it is important to recognize where human control, certainty and design leave off and new and strange arrangements of life and non-life come into being. If waste is seen only as a problem, one that can be solved through human mastery of the environment and material things, then we are back to an older form of anthropology which reduces waste to a symptom of the human search for meaning.

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